



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/915,985	07/25/2001	Detlef Hommel	1999P8006 US N	8172

7590

07/16/2003

LERNER AND GREENBERG, P.A.  
Post Office Box 2480  
Hollywood, FL 33022-2480

EXAMINER

IM, JUNGHWA M

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/915,985

Applicant(s)

HOMMEL ET AL.

Examiner

Junghwa M. Im

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 3-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the first semiconductor layer including 'states' in the first band gap. Since 'state' is in general defined as 'mode or condition of being', it appears that this limitation simply implies that the first semiconductor layer has a first band gap. In addition, the pending claim does not recite any particular limitation for the first band gap. It is not clear what kind of state is being referred.

Claims 3-9 are dependent on the rejected base claim 1.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over to Kitagawa et al (U.S. Pat. No. 5,198,690), hereafter Kitagawa.

Regarding claim 1, insofar as understood, Fig. 10 of Kitagawa shows an

Art Unit: 2811

electroluminescent semiconductor device for comprising:

a semiconductor chip having a first semiconductor layer(27) and a second semiconductor layer (28, 29) adjacent to the first semiconductor layer;

the second semiconductor layer including an electroluminescent region emitting visible light of a first color (a blue light) having a first wavelength (col.12, lines 11-12);

the first semiconductor layer absorbing part of the visible light of the first color and the first semiconductor layer re-emitting visible light of a second color (a green light) having a second wavelength, the second color being different from the first color, and the second wavelength being longer than the first wavelength ( col. 12, lines 10-15);

the semiconductor chip emitting the visible light of the second color together with the visible light of the first color (col. 12, lines 10-14).

Kitagawa does not explicitly teach that the layer corresponding to a longer wavelength has a smaller band gap than a layer corresponding to a light of a shorter wavelength. However, it would be obvious that a layer emitting/absorbing a longer wave length would have a smaller band gap than a layer emitting a shorter wavelength since a light of a longer wavelength is re-emitted through excitation of the substrate by a part of the layer emitting/ absorbing a light of a shorter wavelength.

Regarding claim 4, Kitagawa shows a substrate for epitaxially growing the second semiconductor layer is also utilized as the first semiconductor layer (col. 12, lines 9-10).

Regarding claim 5, Kitagawa shows a semiconductor chip includes a growth substrate and the first semiconductor layer is disposed between the growth substrate and the second semiconductor layer (col. 12, lines 8-14).

Regarding claim 6, Kitagawa shows a semiconductor chip includes a growth substrate for epitaxially growing the second semiconductor layer and the second semiconductor layer has a side opposite the growth substrate while the first semiconductor layer is disposed on the side of the second semiconductor layer opposite said growth substrate (col. 12, lines 8-16).

Regarding claim 9, Kitagawa shows the first semiconductor layer and second semiconductor layer are configured to emit white light from the semiconductor chip (col. 12, lines 21-23).

### ***Claim Rejections - 35 USC § 103***

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa in view of Henry et al. (U.S. 4,570,172), hereafter Henry.

Kitagawa does not explicitly teach that the first layer includes a material with an absorption edge having an energy level corresponding to a third wavelength which is longer than the first wavelength of the visible light emitted by the semiconductor layer and is shorter than the second wavelength and re-emitting radiation of the second wavelength when excited with radiation of a wavelength shorter than the third wavelength. Henry shows a wavelength of a light emitted from re-emitting layer (7) in Fig. 5 is longer than a wavelength of a light emitted from the first layer and shorter than a wavelength of a light emitted from the second layer with the claimed emission state. (col. 4, lines 47-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teaching of Henry into the device taught by Kitagawa since such a layer minimizes the possible migration defects of the light in the substrate.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa in view of Ishikawa et al. (U.S. 5,488,233), hereafter Ishigawa.

Regarding claim 7, Kitagawa discloses that the first semiconductor layer includes doped ZnSe (col.1, lines 32-34). However, Kitagawa does not explicitly teach second semiconductor layer has an active zone containing  $\text{Cd}_x\text{Zn}_{1-x}\text{Se}/\text{ZnSe}$  with  $0 \leq x \leq 1$ . Ishikawa shows that an LED with a CdZnSe/ZnSe layer (107) in Fig.5, formed between the light emitting layers.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ the teaching of Ishikawa to the device taught by Kitagawa since such modification can improve reliability of the device with better light emitting efficiency.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa in view of to Liao et al. (U.S. 4,784,722), hereafter Liao.

Regarding claim 8, Kitagawa does not explicitly teach that semiconductor chip being disposed in a parabolic mirror. Liao discloses that a light emitting diode with a parabolic mirror (32) in Fig. 3.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teaching of Liao into the device taught by Kitagawa since a parabolic mirror on a light emitting device can allow the higher efficiency of the reflectivity favoring the performance of the device.

Art Unit: 2811

*Conclusion*

The prior art made of record and relied upon is considered pertinent to Applicant's disclosure.

JP 10-282494 to Kaneko


JP 09-204982 to Ikezu

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmi  
July 14, 2003

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800